CICADIDAE

By J. G. Myers, Sc.D.

(With 22 Text-figures.)

The cicadas seem to be represented in the Samoan Islands by one abundant and widespread species, and by two others which, judging from the collections examined, are very rare. *Baeturia exhausta* Guér. is essentially Austro-Malayan in distribution, and Samoa would appear to be its eastern limit, which it has reached by a route north of Fiji, in which group it does not occur. *Tibicen kuruduadua* Dist. occurs elsewhere only in Fiji, while the third species belongs to a remarkable new endemic genus—the first peculiarly Polynesian genus of cicadas.* This latter has Austro-Malayan affinities, but is strongly isolated. It is thus apparent that the evidence of the cicadas, so far as it goes, corroborates the general conclusion drawn by Muir from a study of the Fulgoroids, " that the Samoan Islands form an outpost of the Polynesian plateau."

I am deeply indebted to Mr. A. J. E. Terzi for the beautiful drawing of the venation which illustrates the new genus; and to Mr. W. E. China for many courtesies at the British Museum.

Subfamily PLATYPLEURINAE Handl.

Genus Tibicen Latr. 1825

Type *Cicada plebeia* Scop.

1. Tibicen kuruduadua Dist.

Cicada kuruduadua Distant, *Trans. Ent. Soc. London* (1881), p. 645, 1881; *Syn. Cat. Hom. Cicad.*, p. 39, 1906.

Upolu: Malololelei, 1 ♀, 30.viii.1925 (Armstrong).

In the absence of a male, this seems indistinguishable, save by paler colour, from *T. kuruduadua*, hitherto known only from Fiji. As a matter of fact this

* *Dasypsaltria* Haupt. is synonymous with *Platypleura*, and is not Samoan. See below.

female looks more truly congeneric with the type than do the females placed with the latter in the British Museum.

Structurally, except in the greater length of the tegmina, this species resembles *T.* (*Cicada*) *plebeia* Scop., with which it may be considered strictly congeneric. It certainly does not fall into any of the segregates—*Diceroprocta* Stål, *Chremistica* Stål, *Rihana* Distant—which it has been proposed to separate from the genus of which *C. plebeia* Scop. is the type. With regard to this genus I cannot accept Horváth's (*Ann. Hist. Nat. Mus. Hung.*, 23, pp. 93–98, 1926) new name *Lyristes*. The name *Tibicen* was first proposed in 1825, by Latreille (*Fam. nat. Règne Anim.*, p. 426) with *C. plebeia* as the only species mentioned. " Tibicen " is not a French word, as Horváth claims, nor is there any excuse for considering it, as Horváth does, a *nomen nudum*, since *C. plebeia*, given as its example, is still and was then, the best-known cicada in the world. I therefore follow Van Duzee in considering *C. plebeia* Scop. as the type of the genus *Tibicen* Latr. (= *Cicada* auctt. nec Linn.*). This course creates, in the subfamily nomenclature, a difficulty which Van Duzee (*Cat. Hemipt. North Amer.*, pp. 488, 498, 1917) has *not* met by calling the subfamily based on *Tibicen* Latr. Tibiceninae, and the other, founded on *Tibicina* Amyot, Tibicininae. Formed correctly from *Tibicen* and from *Tibicina* respectively, by adding *-inae* to the *stem*, the two subfamily names would be identical. I have therefore followed Handlirsch (*in* Schröder, *Handb. d. Entom.*, Bd. 3, pp. 1115–1117, 1925) in calling the former subfamily Platypleurinae, after another well-known, old and representative genus.

Moana,† g. n.

Head, including eyes, much narrower than base of mesonotum, head produced conically half its length in front of eyes. Frons elongate, considerably swollen basally, smooth and shining, the cross striae indistinct. Antennal scrobes prominent. Ocelli almost contiguous, the median ocellus directed straight forward. Pronotum apically the widest part of body, basally greatly constricted, so that the margins, which are slightly expanded at the apical angles, run very obliquely to the head. Sulci of vertex and pronotum deeply marked.

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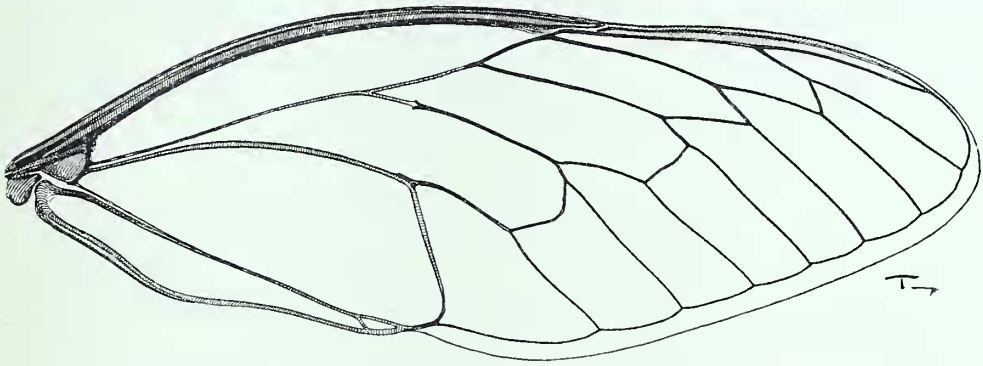
* Since *C. plebeia* Scop. was not among the originally included species of *Cicada* Linn. 1758, it obviously cannot be the genotype. The genotype now generally recognised is *C. orni* Linn.

† *Moana*—Samoan name for the ocean—thus appropriate for a cicadid genus, endemic in Oceania.

Mesonotum twice the length of pronotum; basal three-quarters domed and swollen; cruciform elevation relatively depressed, little developed, much constricted laterally. Abdomen small, conical, four-thirds length of mesonotum, than which it is almost wholly narrower, giving whole head and trunk a general fusiform shape. Tymbal covers complete, consisting of a somewhat narrow tongue reaching antero-laterally from each side of 2nd segment. Legs long and slender. Meracanthus long and slender, and hollowed ventrally.

Tegmina unusually expansive, much longer than body, with wings also, cross-ribbed at wide intervals, especially in the huge cell Cu_1. Stem of M extraordinarily thin and weak, leaving basal cell practically contiguous with



TEXT-FIG. 1.—*Moana expansa* g. et sp. n., tegmen. A. J. E. Terzi del.

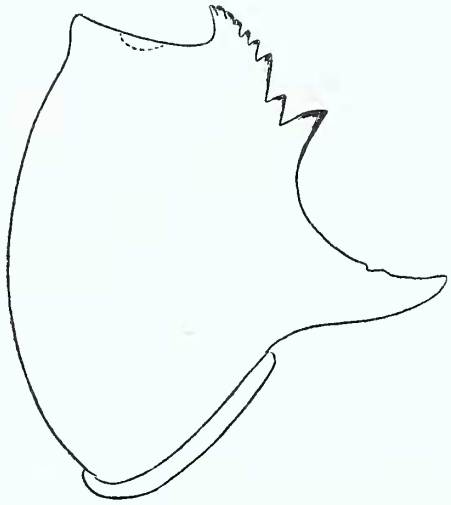
that of Cu_1. Cu_1 very stout, rib-like and compressed almost at right angles to the plane of the tegmen, strongly arched towards costal margin. A_2 very stout, practically contiguous with anal margin, which is itself much thickened, and bent outwards, so that clavus is wider than usual. Nodal line barely discernible on membrane. Hind wings normal, with six apical cells. Pygophor with no median dorsal spine, but two lateral projections directed caudad, as in *Sawda*, *Fatima*, *Cosmopsaltria* and related genera, but shorter. (Rest of the pygophor missing in the case of the type.) Curiously enough in the last nymph of same sex the pygophor bears a typical median dorsal spine.

The position of this genus, partly on account of the poor condition of the unique type, is obscure. The venation, however, shows it to be an extraordinarily aberrant form, which, with some hesitation, I place nearer to *Sawda* Dist. than to any other known genus. The tymbal covers closely resemble those of *Sawda*, though the opercula are much shorter than is usual in that genus. The narrow

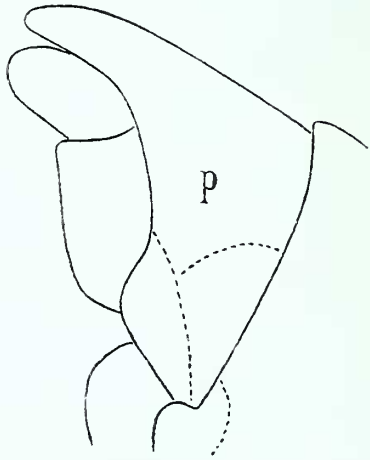
head is another common feature, as are also the close proximity of the ocelli and the sudden dip of the crown, so that the median ocellus looks directly forward. The meracanthus resembles closely that of *Sawda froggatti* Dist. It may be noticed that *Sawda* is an Austro-Malayan genus, with one species (known only from the female) also in Fiji. The present form could perhaps have been derived from a *Sawda*-like immigrant in Samoa.

2. Moana expansa, sp. n. Figs. 1–3, 22.

Male: dull olivaceous brown (type probably faded). Frons, sides of abdomen, and legs somewhat paler. A little scattered pale decumbent pubescence on thorax and abdomen, but no hairs. Ocelli edged with blackish. An indistinct paler median longitudinal stripe on pronotum. Mesonotum shining, with two narrow black longitudinal stripes on each side of disc, the



TEXT-FIG. 2.—*Moana expansa*, last nymphal instar, fore femur.



TEXT-FIG. 3.—*Moana expansa*, abdominal extremity of last nymphal instar of male.

inner pair impressed and about two-thirds length of outer pair, which nearly reach cruciform elevation. Tergites II–VII smudged with blackish centrally, and II–VIII laterally also. Tegmina hyaline, the veins brownish, darker distally.

Crown (including that part of frons visible dorsally) a little longer than basal width between eyes, and equal in length to disc of pronotum without

posterior depressed margin. Eyes very large. Posterior margin about one-fourth total length of pronotum. Opercula rounded apically, barely longer than meracanthus, widely visible in dorsal view. Fore femora weakly armed. Hind tibiae with five non-apical spines. (Hypandrium missing in type.) Lateral projections of pygophor short, blunt, emarginate dorso-apically. (Rostrum and most of legs missing in case of type.)

Length to tip of VIIIth tergite 25·3 mm., tegmen length, 43·3 mm., greatest width of tegmen (about halfway), 15·6 mm.

Male nymph, last instar: Eyes very large, antennae with 8 segments, of which I-IV have the usual few very large setae, while the rest are densely and evenly clothed with numerous small bristles. The tegmen pads show distinctly the strong and much curved Cu_1 and the weak M stem alongside it. Fossorial fore-legs with femora as figured. Pygophor ends in a typical median tergal spine, which is, however, delimited by a furrow shown dotted in the figure. Length 24·0 mm. (Length of head and thorax added to that of the abdomen, to avoid curve.)

Upolu: Lanutoo, 1 ♂, more or less fragmentary, taken from a spider's web; skilfully mended by Mr. China; no date (Hopkins); Malololelei, exuviae of one last instar ♂ nymph collected in rain forest at 2,000 feet, 26.iv.1924 (Bryan).

I have felt very chary of erecting a new genus on such poor material, but when one considers how many new Orders and lesser groups are founded on far less complete fossil insects, the objection ceases to have weight. The genus is well characterised, and the species should be recognisable from the above description.

The nymph, which is in perfect condition, is as aberrant as the imago. In most cicada nymphs known to me (e.g. *Platypleura*, *Henicopsaltria*, *Diceroprocta*, *Odopoea*, *Magicicada*, *Melampsalta*, *Baeturia*, *Tettigarcta*), the antennal segments, even to the apical one, are supplied with a relatively small number (2 or 3 up to about 6 per segment) of very large setae, sometimes as long as the segment itself, whereas in the present species these are replaced on segments V–VIII by numerous small bristles.

Subfamily TIBICININAE Dist.

Genus Baeturia Distant, 1892.

Type *Cicada conviva* Stål.

3. Baeturia exhausta Guér. Figs. 5–9, 11–17, 19–21.

Distant, *Syn. Cat. Hom. Cicad.*, p. 157, 1906.
Cicada exhausta Guér., *Voy.* "*Coquille*," *Zool.*, II, p. 181 (1838), pl. x, fig. 6 (1831).
C. hastipennis Walk., *List Hom. Brit. Mus.*, *Suppl.*, p. 30, 1858.
Dundubia parabola Walk., *Ins. Saund. Hom.*, p. 6, 1858.

Savaii: Safune, up to 4,000 feet in rain forest, 4 ♂♂, 1 ♀, 2 exuviae, v. and xi. (Buxton, Hopkins, Bryan).

Upolu: Apia, Malololelei, Aleipata, Vaea, up to 2,000 feet, 14 ♂♂, 25 ♀♀, 3 exuviae, every month except i. and x. (various collectors).

Tutuila: Pago Pago, Fagatoga, Amauli, 8 ♂♂, 11 ♀♀, ii., iii., ix. (Steffany, Judd, Swezey, Wilder).

Manua: Ofu, Tau, 3 ♂♂, ii. (Judd).

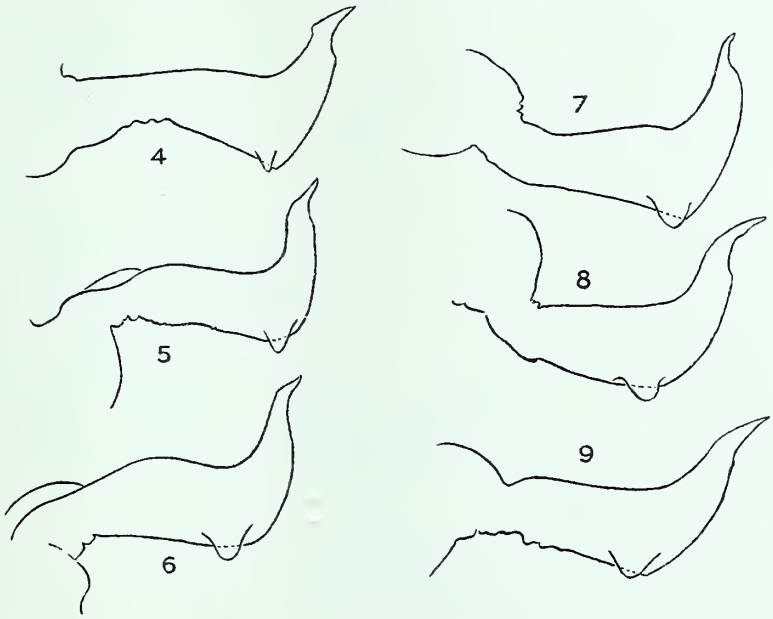
Samoa (island not specified): 2 ♂♂, 5 ♀♀, iii., iv. (Tate, O'Connor, and collector unknown—Brit. Mus.).

Total Samoan material: 31 ♂♂, 42 ♀♀, 5 exuviae (last instar).

There are two abundant and widespread Austro-Malayan species of *Baeturia*, which differ from the other species known to me in the blackish speckling of their pale ground colour. These two, *B. exhausta* Guér. and *B. conviva* Stål, have sometimes been considered only doubtfully distinct (Kirkaldy, *Haw. Sugar Planters' Exp. Sta. Entom. Bull.*, 12, p. 8, 1913). The characters on which they are usually separated are the greater average size of *B. exhausta*, and the extension of its tegminal cell R_5 (3rd apical cell) basad of cell R_2 (1st apical cell), whereas in *B. conviva* the bases of these two cells are opposite. On these two characters the Samoan material all agrees with *B. exhausta*.

Save for the Samoan extension of *B. exhausta*, the range of these two forms seems practically coincident. Judging from the above macroscopic criteria there are in the British Museum examples of both from Buru, Ceram, Amboina and New Guinea. There are specimens of *B. conviva* only from Doré, Timor, Mysol, Batchian and Duke of York I. (Bismarck Arch. ?); and of *B. exhausta* only from Gilolo, Torres Strait and Samoa. Size is at best an untrustworthy character, and in examples from several Austro-Malayan islands, notably Buru, the venational distinction between the two forms also breaks down. In the British Museum there are two males from the same locality in Buru, taken at the same

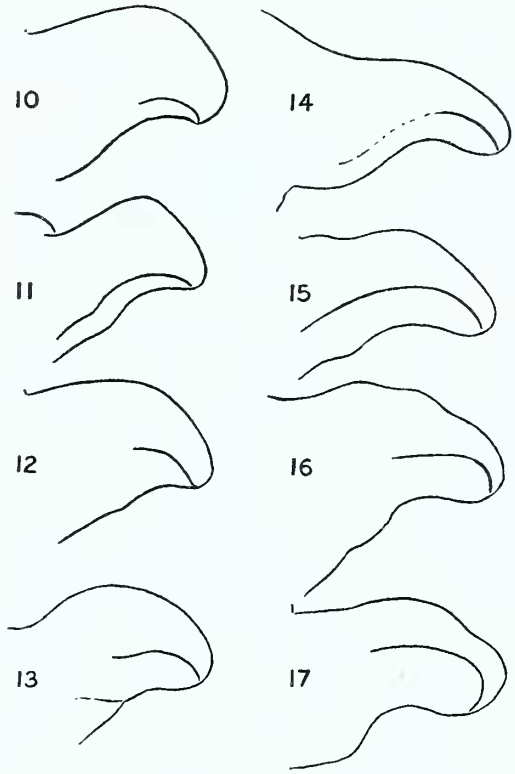
time, and almost identical in other respects, but with the base of cell R_5 basad of cell R_2 in the one, and distad in the other. The apical venation in Cicadidae is not very generally constant in details, although in the 73 Samoan examples this particular character holds. Unfortunately the type of neither species is available for study. The male external genitalia show certain variations, both in the aedeagus and in the copulatory claspers of the Xth segment, but at least in the two males from Buru already mentioned (figs. 6, 7, 12, 13) these are not



TEXT-FIGS. 4–9.—Fig. 4, *Baeturia conviva* Stål, Ceram, aedeagus, lateral view; fig. 5, *B. exhausta* Guér., type of *Dundubia parabola* Walk., aedeagus, lateral view; fig. 6, *B. exhausta* Guér., (example from W. Buru with venation of *B. conviva*), aedeagus, lateral view; fig. 7, *B. exhausta* Guér., (example from W. Buru with normal venation), aedeagus, lateral view; fig. 8, *B. exhausta* Guér., Samoan example, aedeagus, lateral view; fig. 9, *B. exhausta* Guér., (another specimen from Samoa), aedeagus, lateral view.

correlated with the venational differences. On characters presented by the genitalia these two males belong to *B. exhausta*. Figs. 4 and 10 show the corresponding parts in what we must provisionally regard as a typical *B. conviva*, to be contrasted with figs. 5 and 11, drawn from Walker's type of *Dundubia parabola*, which, with Distant, I consider as synonymous with *B. exhausta*. The other figs. (8, 9, 14–17) illustrate the variation among the Samoan material. If the specimen of *B. conviva* dissected by me is really typical, then this species may perhaps be regarded as distinct owing to the longer aedeagus and accom-

panying minor differences in this organ and in the shape of the claspers. On the basis of macroscopic and microscopic characters it is evident that we are dealing with one polymorphic form, comparable with *Metrosideros villosa* auctt. among the Pacific Myrtacae. To settle the question it will be necessary firstly, of course, to examine the respective types, and secondly to study series from the different islands comparable with the extensive one from Samoa that I have been privileged to examine. It seems to me very likely that material from more numerous intermediate stations would yield still more annectent examples than we have at present. In the meantime *B. conviva* is kept doubtfully distinct, and the Samoan forms are regarded as belonging to *B. exhausta*. To show more fundamental variation in genitalia in the genus, the aedeagus of an undoubtedly distinct species, *B. famulus* Dist., is represented in fig. 18.



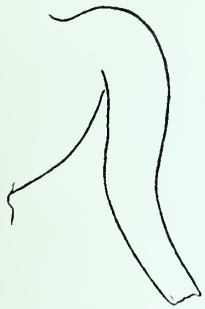
TEXT-FIGS. 10–17.—Fig. 10, *B. conviva* Stål, Ceram, left clasper (Xth segment); fig. 11, *B. exhausta* Guér., type of *D. parabola* Walk., left clasper (Xth segment); fig. 12, *B. exhausta* Guér., (example from W. Buru with venation of *B. conviva*), left clasper (Xth segment); fig. 13, *B. exhausta* Guér., (example from W. Buru with normal venation), left clasper (Xth segment); fig. 14, *B. exhausta* Guér., from Samoa, left clasper (Xth segment); fig. 15, *B. exhausta* Guér., (another specimen from Samoa, Apia), left clasper (Xth segment); fig. 16, *B. exhausta* Guér., (still another specimen from Samoa, Apia), left clasper (Xth segment); fig. 17, *B. exhausta* Guér., Samoan example (Savaii), left clasper (Xth segment).

The type of *Cicada hastipennis* Walk. is a female which agrees specifically with *D. parabola*, and thus presumably with *B. exhausta*.*

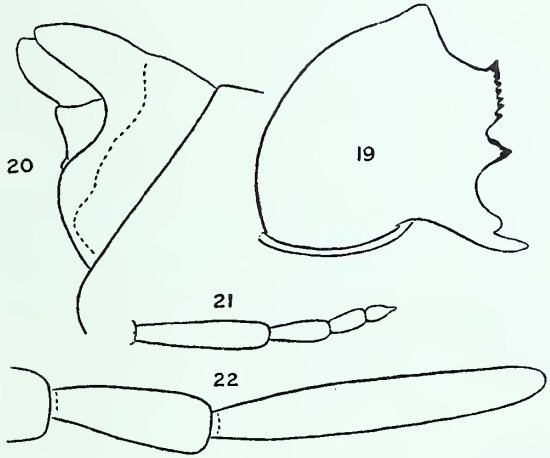
The nymph of *Baeturia exhausta*.—As pointed out on other occasions, the last nymphal exuviae of cicadas make beautiful objects of study. In the present species the antennae have 9 segments, including a very minute

* In view of the above discussion, the *Baeturia* species of Buru are of the greatest interest. Schmidt (*Treubia*, 7, p. 222, 1926) records from the island in question *B. conviva*, *B. exhausta*,

apical one. These segments are supplied, as usual, with a few setae, up to half a dozen on a segment, and sometimes as long as the segment itself. Between these large setae the surface is bare of ordinary hairs. The fore femur and the extremity of the abdomen in the last instar male nymph are shown in figs. 19, 20. Length (length of head and thorax added to that of abdomen) 18·8 mm.



TEXT-FIG. 18.—*B. famulus* Dist., aedeagus, lateral view.



TEXT-FIG. 19–22.—Fig. 19, *B. exhausta* Guér., last nymphal instar, fore femur; fig. 20, *B. exhausta* Guér., abdominal extremity of last nymphal instar of male; fig. 21, *B. exhausta* Guér., apical antennal segments of last nymphal instar of male; fig. 22, *Moana expansa*, apical antennal segments of last nymphal instar of male.

One male specimen of *B. exhausta* from Apia (Buxton and Hopkins) has a mass of hardened adhesive matter clogging its face and mouth-parts. It bears the highly interesting explanatory label, "The value of latex to plants! This cicada tried to suck *Carica papaya*."

B. bicolorata Dist. and *B. schulzi*, sp. nov., but, from his notes based on badly-preserved material I doubt whether the third species is correctly recorded. His *B. schulzi* is said to be related to *B. viridicata* Dist., of New Guinea, but judging from the description it is evidently much more typical. The type of *B. viridicata* has almost opaque tegmina with the ambient vein almost coincident with the margin, and greatly reduced opercula, which reach only half-way along the meracanthus. In these three respects *B. schulzi* would seem more like *B. exhausta* and *B. conviva*. Schmidt's new genus, *Toxopeusella* (*l.c.*, p. 224) is apparently well-founded, although the geno-type, *Cicada stigma* Walk., is represented in the British Museum only by the original female. The common stem from the basal cell of the tegmen is not, however, M plus Cu as stated by Schmidt, but M plus Cu_1 only. The statement that fore and hind wings are in *T. stigma* "quergerippt" and in *Baeturia* not, is incorrect, as an examination of *B. exhausta* and *B. conviva* will show, though this character is certainly more marked in *T. stigma*.

A female example (Apia, ii.1924, Buxton and Hopkins) has a large piece bitten out of the base of the abdomen, and was taken from a large introduced wasp, *Polistes macaënsis* which had captured it. Vespids are also known as enemies of cicadas in North America (Davis).

" *Dasypsaltria maera* " Haupt = *Platypleura divisa* (Germ.).

In 1917 Haupt (*Stett. Ent. Zeit.*, Bd. 18, p. 303, fig. 1) erected under the name *Dasypsaltria*, a new monotypic genus to receive *D. maera*, a supposed new species believed to have been collected in Samoa. On 7th June, 1926, Herr Haupt was so good as to write to me regarding this species as follows :—

" In meiner *Dasypsaltria maera* möchte ich bemerken, dass ich da getäuscht worden bin. Sie gehört zu der stark variierenden *Platypl. divisa* Germ., was ich aber wegen des etwas abnormen Pronotums leider zu spät erkannte. Getäuscht wurde ich auch durch die Herkunfts-Angabe. Einer unserer Kolonial Beamten hatte das Tier in Süd-Afrika erbeutet, reiste von dort nach Samoa und sandte es von dort zur Bestimmung nach Halle." *Dasypsaltria* is thus a synonym of *Platypleura*.

In the meantime, unfortunately, Kato (*Trans. Nat. Hist. Soc. Formosa*, 17, p. 210, 1927) has described a new Formosan cicada as *Dasypsaltria formosana*.

LIST OF TEXT-FIGURES.

(Corresponding parts shown at similar magnification ; hairs and setae omitted.)

Text-fig. 1. *Moana expansa* g. et sp. n., tegmen, A. J. E. Terzi del.
,, 2. *Moana expansa*, last nymphal instar, fore femur.
,, 3. *Moana expansa*, abdominal extremity of last nymphal instar of male.
,, 4. *Baeturia conviva* Stål, Ceram, aedeagus, lateral view.
,, 5. *B. exhausta* Guér., type of *Dundubia parabola*, Walk., aedeagus, lateral view.
,, 6. *B. exhausta* Guér., Bara, W. Buru (example with venation of *B. conviva*), aedeagus, lateral view.
,, 7. *B. exhausta* Guér., Bara, W. Buru (example with normal venation), aedeagus, lateral view.
,, 8. *B. exhausta* Guér., Apia, Samoa, aedeagus, lateral view.
,, 9. *B. exhausta*, Guér., Apia, Samoa (another specimen), aedeagus, lateral view.
,, 10. *B. conviva* Stål, Ceram, left clasper (Xth segment).
,, 11. *B. exhausta* Guér., type of *D. parabola*, Walk., left clasper (Xth segment).
,, 12. *B. exhausta* Guér., Bara, W. Buru (example with venation of *B. conviva*), left clasper (Xth segment).
,, 13. *B. exhausta* Guér., Bara, W. Buru (example with normal venation), left clasper (Xth segment).
,, 14. *B. exhausta* Guér., Apia, Samoa, left clasper (Xth segment).
,, 15. *B. exhausta* Guér., Apia, Samoa (another specimen), left clasper (Xth segment).
,, 16. *B. exhausta* Guér., Apia, Samoa (still another specimen), left clasper (Xth segment).
,, 17. *B. exhausta* Guér., Savaii, Samoa, left clasper (Xth segment).
,, 18. *B. famulus*, Dist., aedeagus, lateral view.
,, 19. *B. exhausta* Guér., last nymphal instar, fore femur.
,, 20. *B. exhausta* Guér., abdominal extremity of last nymphal instar of male.
,, 21. *B. exhausta* Guér., apical antennal segments of last nymphal instar of male.
,, 22. *Moana expansa*, apical antennal segments of last nymphal instar of male.